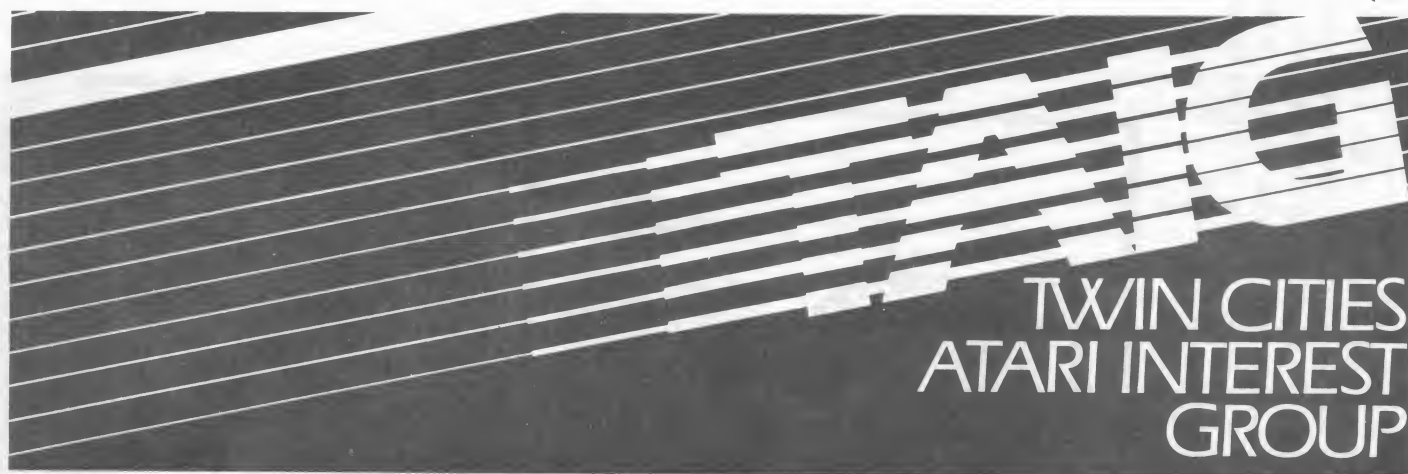


JUNE 1986



## TWIN CITIES ATARI INTEREST GROUP

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President: Dick Johnson (521-0245) Vice President: Jim Glish  
Treasurer: Phyllis Landsman Secretary: Dave Stengel  
Newsletter Editors: Cory Johnson & Dave Stengel

### Editor's Notes by Cory Johnson

This newsletter turned out much larger and better than I had hoped when I started printing and doing lay out earlier this week. This doesn't say anything about the members, for 80% of this newsletter is reprints. Thanks to Virginia Keith and Steve Ingalsbe for their contributions.

Thanks also to The Barn BBS for supplying the 256K 800XL Article to us.

Do to a small oversight on my part, I'll give credit for the reprints here rather than with the articles themselves.

The 15K 800XL (unmodified) Ram-disk was reprinted from Nybbles & Bytes, newsletter of the N.W. Pheonix Atari Connection.

The 130XE 512K upgrade was reprinted from The I/O Connector, newsletter of the San Diego Atari Computer Enthusiasts.

The article on non-standard memory upgrades was also reprinted from the I/O Connector.

The Rambo XL review was reprinted from the Bay Area Atari Users Group newsletter.

Remeber the elections will be held at this months meeting.

### Article submission

Articles should be submitted in standard text file (Atari Writer, Hometext, Speedscript) format.

If you don't own a wordprocessor, you can enter an article into BASIC using REM statments. Or, send legibly written or typed text (make any schematics legible also, we can't reprint what we can't read) to

Cory Johnson 1835 Shadyview Circle, Plymouth, MN. 55447  
473-4190

Dave Stengel 3230 Shadyview Lane, Plymouth, MN. 55447

Articles may also be dropped off at

Wizard's Work 18th and 36th, New Hope, MN.

If you wish, you can also upload your article to the BBS. Leave a message to the sysop stating that the upload was an article. The BBS number is 473-2897

### DEADLINE

Deadline for submission is the 10th of the month. Any articles recived after the 10th will be held until the next newsletter.

### Classified ads.

Taig members may also submit FREE classified ads 2 lines in length. Ads are submitted in the same manner as articles.

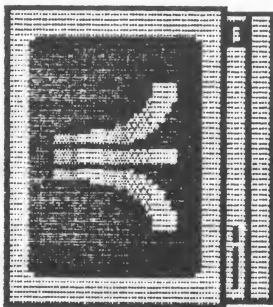
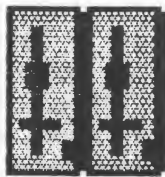
Notes from the Pres - Dick Johnson  
Well this month is elections.  
The candidates are:

President Steve Engalsbe  
Vice President Tom Green  
Treasurer Richard Johnson  
Secretary ?????????? (How about YOU)

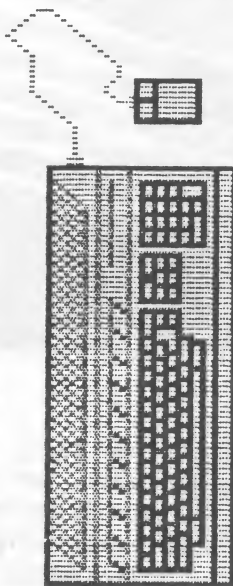
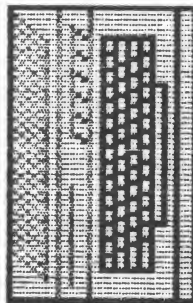
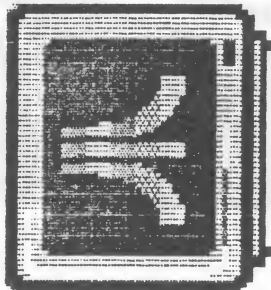
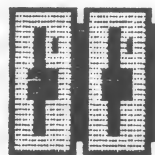
Most of the Atari news is in the download file so we'll stick to club news. Last week we represented the Atari user groups of the twin cities at the Amateur Fair. Steve & Tom plan more exposure for our group, but I'm sure that we'll want more help and commitment from the membership at large.

Steve if elected (are there any other candidates?) he plans to shake up this club and generate some interest again. I wish him luck and support, but for all of us to succeed we'll have to work together. Now I've beat this drum before and I'll probability do it again but it takes teamwork for a club to succeed, so come on out and see what the new offices have got planned.

130 XE



520 ST  
1040 ST



TWIN CITY ALL ATARI DEALERS

USER FRIENDLY

8461 PLAZA BLVD. NE  
SPRING LAKE PARK, MN

55432

786-8181



Authorized Sales and Service

The following are excerpts from Antic's reports downloaded from CompuServe. For the first time in many months most of the news was about the 8 bit machine, so much in fact I've trimmed out the ST news to make room for the good stuff.

Dick Johnson

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ATARI CORP'S BIGGEST BOOTH EVER By JACK POWELL  
CHICAGO CES: THE FIRST DAY CHICAGO, IL June 1, 1986 --

Atari's exhibit space at the Chicago Consumer Electronics show is the largest seen since the Tramiels took over the company. Walls of monitors displaying Atari software, ranging from ST computers to 2600 game machines, surrounded some 35 third-party developers showing off both 8-bit and ST software.

#### THIRD-PARTY DEVELOPERS

Judging from this show, the Atari software business seems very active -- certainly more so than in recent shows. Several companies with Atari booths had their own booths elsewhere on the floor. Later reports will detail the software available from these companies. Meanwhile, the companies are displaying the following products within the central Atari area:

Artworx is showing its bridge programs for both 8-bit and ST, and Hole-in-One Golf for the ST. They also have a new 8-bit program called Peggamon.

Zobian Controls -- The Rat, a mouse for 8-bit Atari computers.

First Star Software -- The company that made Spy Vs. Spy and Boulder Dash for the 8-bits is coming out with Comic Strip Maker, a graphics program for the ST.

Softsync -- Personal Accountant, an 8-bit financial program.

Academy Software -- Typing Tutor and Word Invaders for both 8 and 16-bit Ataris

Spinnaker -- Displaying an extensive line of 8 and 16-bit educational and adventure game products.

American Educational -- A series of educational software for 8-bit Ataris.

OSS -- 8-bit and 16-bit programmer's tools.

ICD -- Some exciting 8-bit hardware, including the ICD Multi I/O Board, a new multi-use I/O board which plugs into the parallel port. (More about this in the next report.)

XLENT -- Displayed the entire line of products, including many printer/graphics packages available for both 8- and 16-bit machines.

Haba Arrays -- Get Rich, a financial planning package for 8-bit machines.

Britannica Learning -- A series of educational programs for the 8-bit Ataris.

Batteries Included -- A new version of Paperclip for the 8-bit with Spellpack. Thunder, a real-time spelling checker.

Electronic Arts had two Atari booths. One to show off their long line of 8-bit game products and the other to display Financial Cookbook for the ST. According to an EA

spokesperson, such EA hits as Golden Oldies will be adapted to the ST, but there EA is not currently planning to adapt Marble Madness to the 16-bit Atari computer.

Covox -- Voice Master, Atari 8-bit voice recognition software.

SSI -- Booths for both lines of Atari computers and displayed many of its very successful strategic games.

By the way, I'm writing this story upstairs, right outside the Commodore booths, the only place in the hall where it's quiet enough to concentrate.

FINALLY, THE 80-COLUMN CARD CES: THE SECOND DAY  
CHICAGO - 6/3/86 -- On the second day of the Consumer Electronics Show, we took a closer look at some of the many computer products filling the basement of McCormick Hall West.

Atari's John Skruch, Manager of XE Software Products, showed us the XEP 80 -- the long-awaited 80-column adapter for the Atari 800, XL/XE computers. The adapter is "new-Atari" gray-colored and just slightly smaller than the old Atari 850 interface. As Skruch said temptingly, "It has the same 'footprint' as the 8-bit 3.5-inch drives."

Atari Corp. is still not ready to announce the long-rumored 3.5-inch drives for the 8-bit line. But reliable sources within the company report that the drives will have a capacity of 325K, formatted, and the Disk Operating System will be compatible with DOS 2.5.

The XEP 80 has a standard Centronics parallel printer port in the back, an RCA monitor input, an I/O cord that plugs into either joystick port and an input for its external power supply (which is about the same size as most modem power supplies).

The card was demonstrated on a standard green monochrome monitor and the letters looked as crisp and clean as an IBM PC screen display. Atari claims the adapter will also work with a color monitor, but not satisfactorily with a television set.

Built-in software supports the entire Atari internal character set, including special graphics characters, plus the Atari international set and an expanded international set contained in the ROM of the XEP 80's controller chip.

The card supports any call which works with the E: device and has such special effects as black on white or white on black, double-width or double-height characters, and blinking or solid cursor and characters.

Skruch said there was a special "burst" mode which printed text to the screen "four times faster" than normal. Although cartridges such as BASIC XE, from OSS, work with the new adapter, most software will have to be specially adapted for it. Also, programs that use bit graphics will have to try something else, since the usual bit graphics screen fills only half the 80-column screen.

The XEP-80 is expected to reach dealers in late fall with a price tag just under \$80.

#### ATARI PRINTERS

Ever since Atari displayed the first ST a year ago, it has been showing printers. Only now are the dot-matrix graphics peripherals being shipped, at a price of \$219.95.

The XMM 804 for the ST and XMM 801 XE printer are essentially the same.

The 801 is compatible with the Epson medium-resolution graphics mode and contains a built-in interface for the 8-bit machines. The 804 supports up to 1,280 dots per inch and uses a standard centronics cable to link it with the ST.

Though both machines were designed to be as compatible as possible with Epson printers, they are also fully compatible with the earlier Atari 825 printer and are designed primarily as a new, improved printer for those who previously owned the 825.

#### THE ONE MEGABYTE XE

While many companies have jumped on the ST bandwagon, ICD has been quietly churning out important hardware items for the 8-bits, including a straight-connect modem cable for \$14.95, a low-cost printer connection for \$59.95, and The P:R: Connection, a replacement for the Atari 850 modem interface. The P:R: Connection (\$89.95) is a small box with one printer port and two modem ports. It gets its power from the computer and works on any Atari 8-bit machine.

Yes, now you can have a 1-megabyte 130XE. The ICD Multi I/O Board plugs into the parallel bus port and sells for \$199 for a 256K version and \$349 for a 1-megabyte board.

Included in the board are a parallel printer interface, a serial printer/modem interface, a printer spooler and a hard disk interface. According to ICD, a standard hard disk can be used with either a SASI or SCSI controller card. The product is also compatible with the Supra hard disk.

ICD's display system was configured with two hard disks and one floppy, with built-in software permitting segmenting of the hard disks. The screen displayed four hard disks at 260K, 10Mb, 9Mb and 3Mb, plus three RAMDISKS at 192K, 256K and 512K; and finally the one floppy. Oh yes, and a 64K printer spooler.

ICD said that any DOS can be used with the Multi board. The whole thing sounds like a dream come true for 8-bit power freaks.

#### RATS, AN 8-BIT MOUSE

Matthew Zobian, of Zobian Software, showed us his baby "the Rat", a mouse for the 8-bit Ataris. Zobian feels the mouse is the "wave of the future" in computers and, because the Atari 8-bit is such an excellent graphics machine, it seems perfect for mice -- or rats.

The Rat comes with its own software, including a graphics program and a cursor control routine. But Zobian realizes he must court other software developers to make a success of his interface. Accordingly, he told us that MTS is developing mouse-compatible Big Picture and Artist Unleashed -- both graphics packages. RAMBRANDT, another paint program, and a business management package by Reeves Software are also being adapted to The Rat.

The single-button Rat is an analog mouse which plugs into the joystick. Zobian claims that it is very easy to program. Without accompanying software, the Rat sells for \$89.95.

#### FIREBIRD DEVELOPS THE PAWN FOR 8-BITS

CHICAGO, IL 6/3/86 -- The 800XL and 130XE are back. If the product displays at the Spring Consumer Electronics Show here in Chicago are any indication, more companies are beginning to support these powerful 6502-based graphics computers, partly due to the enthusiasm their 68000-based sibling is receiving.

The Pawn, the successful -- and difficult -- 520 ST graphics/text adventure, is currently being adapted for the 800 XL and 130 XE and will be released in this country through Firebird Licences.

The Atari 8-bit version of the game will have all the complexity of its ST cousin and the same incredible parser and graphics, but half the graphic resolution. Programmers at Magnetic Scrolls, the technically sophisticated software development group from Great Britain, are playing with the display list to imitate the ST full color spectrum on 8-bit screens.

The new Pawn will also have a postage stamp-size graphic image sitting in the upper-left corner of the screen to give you an idea of where you are. And for hard-core text adventures who feel graphics are sissy (and rightfully so) a non-graphics mode ignores the 30 pictures stored in the game.

#### DATASOFT SUPPORTS THE 8-BITS

Datasoft displayed strong 8-bit Atari commitment with a new line of software. Yie Ar Kung-Fu, a Kung Fu game from Japanese firm, Kjonami priced -- like most of Datasoft's 8-bit products -- at \$29.95 will be available by Christmas. Fight a succession of increasingly skillful warriors until you finally reach a warrior as good as yourself. Datasoft didn't say what happens if you beat yourself.

221B Baker Street, a Sherlock Holmes graphics/text adventure, can handle up to four players. The game includes 30 different cases on one disk and add-on disks are planned for \$14.95 each.

In the underground labyrinth of Mercenary, map and wander the dimensional rooms in this complex 3-D maze game featuring vector graphics. On the planet surface, the game turns into more of a flight simulation arcade game.

Gunslinger is another graphics/text adventure -- this time with a western theme. Never Ending Story, available now, is a graphics/text adventure based on the fantasy movie of the same name.

The Dungeon Module of Alternate Realities is expected to ship in the third quarter. Datasoft also demonstrated a preliminary version of Alternate Realities for the ST which basically scrolled continually around the street maze. No control and no sound, but the graphics were very clean and detailed. They hope to have it out by September. But with Alternate Realities, you never know.

Steve Meretzky, co-author of the Hitchhiker's Guide to the Galaxy game and author of Planetfall, has come up with The Leather Goddesses of Phobos, a racy spoof of the pulp sci-fi novels of the 1930s. According to Meretzky, it's "the first Infocom game with sex."



There are three levels of play: Tame, Suggestive, and Lewd. Continuing Infocom's policy of highly entertaining -- and piracy-proof -- packaging, Goddesses will include a 3-D comic book (complete with glasses), and an "enticing" scratch & sniff card, which is essential to completing the game.

#### ANTI-NUCLEAR ADVENTURE IS "ONLY A GAME"

You're an American tourist in London when you suddenly learn that a hydrogen bomb is about to destroy the city.

This is Trinity, a chilling anti-nuclear text adventure.

Written by Brian Moriarty, originally a staff programmer for Analog Magazine and author of Infocom's highly successful Wishbringer, the game places you in historically recreated simulations where nuclear bombs have exploded in the past.

You are given a chance to prevent each one and, if you succeed, eventually work your way back to the first: New Mexico, July 16, 1945. Prevent that and you prevent the whole chain of nuclear history.

This is the first Infocom game to faithfully recreate actual events and locations. It's a bold concept, but Moriarty emphasizes it is "only a game."

#### FEMININE MYSTIQUE

Jim Lawrence, who used to write the Nancy Drew series, and "Witness" programmer Stewart Galley joined forces to create Moonmist. This beginner-level "romantic haunted castle mystery" game is designed to appeal to feminine sensibilities but will, they hope, appeal to both sexes.

**16 IS NOT ENOUGH: THE 32-BIT ST** CES: THE LAST DAY 6/4/86 CHICAGO -- Tantalizing glimpses of the long-rumored ST 32-bit machine were offered by Atari Software President Sig Hartmann and Computer Product Marketing Manager Brian Kerr.

Presumably an operating system compatible with UNIX, the multi-tasking operating system developed by ATT Bell Labs.

According to Kerr, the 32/32 uses the Motorola 68020 chip. The 68020 is in the same "family" as the 68000, making all 520ST and 1040ST software "downwardly-compatible" with the new machine. Atari is toying with two possible configurations: either an open architecture machine with slots, or using the ST as front end to the 32-bit as number cruncher.

**TERMINAL SPORTS:** Hardball, Accolade's baseball program for 8-bit Ataris has some very detailed, three-dimensional graphics and a good sense of play. Also available for the 8-bits is a fight game called, appropriately enough, Fight Night. Both games will be available in July for \$29.95.

**BUSINESS IS WAR:** Avalon Hill was touting Spitfire 40, a game and flight simulator for both the ST and 8-bit, available in October at \$35 for both machines. For the 8-bit only is Mission on Thunderhead (\$25), an arcade adventure which is available now. In September, 8-bitters can look to this company for Guderian, a strategy game priced at \$30.

**PENGUIN DOES IT AGAIN:** A few years ago, Penguin Software -- makers of adventure games such as Transylvania -- created a marketing stir by lowering their prices to

\$19.95 at a time when everyone else was selling game software for \$49.95.

Well, they're doing it again. At CES, they took the opportunity to announce that all Penguin ST software will henceforth be priced at \$19.95. Many Penguin 8-bit products are even lower.

**INFILTRATOR:** For the 8-bit crowd, Mindscape will be releasing Infiltrator, a C-64 port. Described as a "strategy adventure", it sounds more like an arcade game. You are helicopter ace Captain Johnny "Jimbo- Baby" McGibbitts. Your mission is to fly through hostile enemy air space. No release date was given. Price is expected to be \$29.95.

**SUPRA DRIVERS:** Did I mention the Supra 20-meg hard disk that is about 3 1/2-inches longer than an Atari 3 1/2-inch drive, but otherwise the same size? How about the Supra 60-meg hard disk which is the size of the old Supra 10-meg? Supra scattered a few of these at select booths at CES just so we would believe they really exist.

**80-COLUMN CARD ADDENDUM:** For the technically minded who are wondering how to program the Atari 80-column card, Jose Valdez of Atari tells us the adapter takes E: device calls and can also receive P: device calls. Just send certain codes to the device and you're on your way.

The card will be completely "transparent" to any software using the E: device -- such as BASIC cartridges. Programs addressing the screen directly will run into some unusual problems and have to be reprogrammed to work with the new card.

**A-MAZE-ING!** Xanth, creator of the 8-bit and ST Boink! and Fuji Boink! demos is developing a 3-D maze game with smooth-scrolling mazes. The trick here is that Xanth plans to make this a multi-machine game where each player can track down another with the maze.

**XLENT:** Xlent Software will be adapting all its 8-bit products, including Rubber Stamp and Page Designer, to run on the new Atari XMM 801 printer. Xlent will also create a translator program to make your computer "think" the XMM 801 is an Epson.

Mastronic International, a London-base software firm with stateside offices in Maryland, showed several games for the 8-bit and announced more to come for the ST.

Ninja, Speed King, Electra Glide, and Action Biker are 8-bit games at the low price of \$9.99. Ninja will be adapted for the ST along with another game called Mirage.

Hi Tech Expressions has a series of Print Shop-like programs with the added gimmick of in-computer animation presentations. Cardware (greeting cards), Partyware (placemats and invitations) and Heartware (mushy stuff) retail for \$9.95 each.

Want some cheap software? The Keypunch Software series of titles for the 8-bit all retail for \$6.99 and include Space games, Adventure Pak and Mind Mazes. Each disk is a collection of three to four games.

PS -- Commodore did not display the Amiga in their booths.



Hats off to the candidates!

ONE Point of View  
by Virginia Keith

You want an article for the newsletter, well here you are. I have just received the latest newsletter, and no one seems to know why a feeling of apathy is running rampant in the club. Let me take you back in time, and tell you why I joined TAIG, back to February, 1984. I had just walked into the first TAIG meeting I had ever attended, it was good. There were vendors there to support your machine with neat looking software. We were new owners of a sleek Atari 800. Not only was it (TAIG) fun, but it was informative. These vendors were willing to talk and show you how to do new and exiting things with our machine. We found programs a little high priced, but with demos at the meeting and the availability of these programs from the vendors present, it was a winning combination. Now back to 1986, Ho Hum, the vendors that do show up for the meetings, in my opinion, don't care about the old 800 owners. They no longer give support, even though I have bought some very large items at the meetings. Oh, they will deny that they no longer support the old machines. I no longer buy from the few vendors that show up for the meeting. Even if a good program is demoed at the meeting, 99% of the time I can't buy it because no one has it to sell. Maybe it is time to just look at a mail order catalog and stay home.

Counterpoint  
by Cory Johnson

Although I am not a vendor at the meetings, I thought the opposing views also were merited equal representation in the newsletter.

Contrary to Virginia's beliefs, the vendors are not obligated in anyway to support the old 6502 line, that obligation lies with the owners of these machines. You must let the vendors know that you do exist, that you still buy software, and that you would like that particular vendor to support your machine.

Although it'd be very nice for the vendor to have five copies of each title they supply in stock so you can buy it at a meeting, it's a very unrealistic expectation. First, there is simply too much stock to bring in a copy of every piece of software, and every nifty piece of hardware they carry, so, often they have to guess at what will sell. Being human, they may have brought Deadline, when you wanted Suspect, even vendors are allowed to make these horrific mistakes from time to time. Then there is transporting this inventory, and paying people to sell it. If the owner doesn't have enough family power that will work for free at the meetings, he has to pay someone at least \$3.35 an hour to sell at a meeting, TAIG meetings aren't exempt from federal minimum wage laws.

So, after expending much time, effort and money (gas, labor, what not) the vendor sells, perhaps 3 software titles, 1 joystick, and a few Antics and Analogs, after a few disappointing evenings sales like this, the vendor HAS to cut the inventory he hails to the meeting.

Then it becomes a vicious circle. They bring less, and you boycott them because of it. So vendor support falls to nill.

Why don't you buy the software at the meeting? Price too high? Sorry to inform you, but a loaf of bread costs the vendor the same 99 cents it does you. They sell software and hardware to make a living, not to provide software as a charity service (software-aid?) to all the bargain shoppers out there. That software has to pay for everything, store rent, utilities, wages and the new stock that is coming in, and any software that doesn't sell becomes a financial burden to the vendor.

So, instead of throwing up your hands in disgust, and quitting over this, wouldn't it have made more sense to have talked to the vendors, and seen their position before pointing a nasty finger in their direction?

Also, in my opinion, TAIG should not rely on the vendors to support the club. TAIG should be the main attraction, and the vendors purely a present sideshow. I honestly think it is unrealistic to blame TAIG's recent demise upon the vendors. Simple solutions and finger pointing always sounds good at first, but the problems are always more deeply rooted, and shallow solutions only prolong problems, and make the club fester even more. When TAIG starts to support itself, maybe we can support the vendors enough so they can reciprocate the action.

Candidates Notes & News  
by Steve Ingalsbe

As most of you know (if you attend the meetings), Tom and I are running for the positions of President and Vice President this month. I thought that I would tell you a little bit about how that came about, and where we intend to go from here.

At the April meeting, Dick Johnson announced that he would not be running for President again, and that he thought that TAIG should merge with SPACE. This would give us a larger user base to draw on for support. Tom and I did not want to see TAIG fold, so we decided to try and do something to stop that. We feel that we can get the group back on its feet, and increase the membership. The first thing that we decided to do was make sure that TAIG was at the Amateur Fair '86. If you want to get new members, you have to let them know that you exist. Amateur Fair '86 is billed as the upper midwest's largest Electronics & Computer swap and show, and we wanted people to know that ATARI is still one of the top Computer companies. As long as people think that ATARI is dead, you will not have people buying the computer, or developing new software. You have to let them know that we are still here.

The sewill not have people buying the computer, or developing new software. You have to let them know that we are still here.

The second thing that we decided needed to be changed was the BBS. This is a little bit different than the Amateur Fair. We don't have to be Officers of TAIG to represent TAIG at the Fair, but we do have to be Officers to do anything about the BBS. We would like to move the BBS to Tom's house (the current home of the ATARI BARN), and to put the Supra Hard Drive on the club board. The main reason for doing this is that the Percom drives are unreliable. This has been the main problem with the TAIG BBS in the past year. By removing them from the system, we are hoping the system will be up and running at all times. We feel that this is the best way to get news to the user group between meetings.

The third thing that we feel needs to be changed is member participation. At the May meeting, Dick asked for people to help at the Amateur Fair, and for someone to help fold newsletters, and for someone to take minutes at the meetings. We did not get one person to help out. If you want this club to keep on running, you have to help out. By the time you read this, it will be too late to help at the fair, but you can still help the club. Maybe you are to shy to sit up at the front table and take the minutes- No problem. You can do it from the audience. Then after the meeting you can type the up and upload them to the TAIG BBS, or mail them to the newsletter editor. The same procedure can be used for writing articles. Just upload them or mail them. Its really quite easy to do. If you do submit an article, you get a

free disk of the month (you can even pick which month's disk you want). Also remember the next time you are calling your favorite BBS and find a new public domain program to upload it to TAIG's BBS, or bring it in to the next meeting to be included in the next disk of the month.

Which brings me to the fourth and final subject of this article, which is raising money for the club. We are always looking for ways to get some cash into the coffer. We would like to see the club sell disks, and maybe selected software and/or hardware. Within our group we have great buying power. We should be using it to save some money. It could also help the club by marking the product up 5% for resale at meetings. We save money and also put some cash into the bank for future equipment, or booths at future computer fairs, or whatever.

Well, now you know where we stand on most issues. How do you feel? We would like to know. This is your club - be active!

#### RAM DISK FOR THE 800XL

A RAM disk is a part of the computer's memory which the computer treats as if it were another disk drive. Files and programs can be saved to it and loaded back in much less time than that required for regular disk drives. To create a 15k RAM Disk (using the extra memory in the 800XL):

1. Boot up with DOS 2.5
2. Type POKE 1802, PEEK (1802)+128 (RETURN)
3. Type DOS (RETURN)
4. Type L (RETURN) RAMDISK.COM (RETURN)
5. Type I (RETURN) 8 (RETURN) Y (RETURN)
6. Type H (RETURN) 8 (RETURN) Y (RETURN)
7. Type D (RETURN) D8:DOS.SYS (RETURN) Y (RETURN)
8. Type B (RETURN)
9. Type POKE 5439,56 (RETURN)
10. Type DOS (RETURN)

The DOS Menu should now appear almost instantly. It is stored on the RAM disk which the computer identifies as Drive #8. You can now store anything you like on Drive 8 if: 1) it will fit (a regular drive stores 92K; Drive 8 will only hold 154K) and, 2) you copy it to a regular disk before you turn off the computer (a RAM disk evaporates when the power shuts off).

If you want to be able to get to the DOS menu while you are programming and then return to your program, you must create a MEM.SAVE file on Drive 8. (This takes so long on a regular drive that most people don't bother; it is instantaneous on your RAM disk). After step 10, above:

- 11 Type N (RETURN)

Now when you go to DOS your current program will be saved to disk 8 and returned to the screen when you exit DOS (by typing B (RETURN)).

SUPPLIED BY THE CHADS BBS  
(517) 371-1106  
A 130XE-COMPATIBLE 256K  
UPGRADE FOR THE ATARI 800XL  
by Claus Buchholz

I designed the 256K upgrade described in my article, "The Quarter-Meg Atari" (BYTE, September, 1985 and recapped here in this article), in December, 1984. Since this predated the 130XE, there was no precedent for extended memory on the XLs. I felt free to implement a system of eight 32K banks. The major reason was to keep the add-on circuit as simple as possible. The 130XE, introduced in early 1985, set a different standard for bank-select memory. It uses 16K banks and makes them separately available to both the CPU and the video controller (ANTIC). The XE has 128K total memory. The 64K extended RAM is split into four 16K banks. A 256K 800XL has 192K extended RAM, which requires 12 16K banks. I have designed a new upgrade for the 800XL that implements such a scheme. Its similarity to the 130XE's scheme allows use of software for the XE on a 256K 800XL.

To select one of four banks, the XE uses two bits, #2 and #3, in the memory control register (port B of the 6520 PIA, addressed at \$D301 or 54017 decimal). Zeroing bit #4 makes the selected bank appear at addresses \$4000-\$7FFF (16384 to 32767 decimal), as seen by the CPU. Zeroing bit #5 makes it appear there as seen by ANTIC.

In my upgrade, bits #2, #3, #5 and #6 select one of the twelve banks. Zeroing bit #4 makes the selected bank appear at \$4000-\$7FFF to both the CPU and ANTIC. So, any program for the XE that uses the extended RAM for CPU storage will work on an 800XL with this mod. Those programs won't use the additional 128K, though. Programs that use the video banking feature of the XE might run on the modified XL, but the screen display will be wrong.

#### The Dynamic RAM

Each chip inputs or outputs one bit at a time, so each bit has a unique address. For the 256K-bit chip the address requires eighteen bits. The chip has nine address inputs, each of which does double-duty. During the first part of a memory access, half of the address bits are presented to the chip. This half is called the row address. Later in the access cycle, the chip receives the other half of the address, called the column address. The storage cells in the chip lie in a matrix, and the cell being addressed lies at the intersection of the row and column specified. To complete the access cycle, the chip reads or writes the selected bit.

The 800XL uses 64K-bit RAM chips, which have eight address inputs for an eight-bit row address and an eight-bit

column address. This is fine for the 16-bit addresses the 6502 gives. There are eight of these chips, each contributing one bit to each byte of RAM.

The 256K-bit RAM is practically identical to the 64K-bit RAM except that it has one extra pin to accommodate the two additional address bits it needs. This extra pin is pin #1 on the chip. Pin #1 on the 64K-bit chip has no function. The functions of all the other pins on both chips are identical.

Therefore, our upgrade involves unplugging the eight 64K-bit RAMs and plugging eight 256K-bit chips in their place. We must also add some circuitry to provide two extra address bits for pin #1.

The storage cells in dynamic RAM chips are actually microscopic capacitors, storing an amount of electric charge that represents a 0 or 1 bit. Since capacitors leak charge, they must be periodically recharged or refreshed. The chip refreshes one or two entire rows when accessed. This means that every row must be accessed frequently to keep the stored data accurate. Since normal operation of RAM can't guarantee that, the computer system must provide special access cycles called refresh cycles. A refresh cycle is a dummy read cycle in which a refresh address is used as the row address.

The 16K- and 64K-bit RAMs require seven-bit refresh addresses. The computer must provide all 128 possible refresh addresses every few thousandths of a second to keep the RAM refreshed. In the Atari, the video controller provides refresh cycles in addition to its screen memory accesses. It automatically provides seven bits for the refresh address. It turns out, the Atari spends four percent of its time refreshing RAM.

One snag in designing the 256K-byte upgrade is that standard 256K-bit RAMs require an eight-bit refresh address. Older versions of the Atari video controller chip provide only seven bits of refresh address, whereas newer versions give all eight. So, there are two versions of the upgrade's interface circuit. The more complex one must add another bit to the Atari's refresh address.

#### Notes on Bank-selection

To fit 256K bytes into the 6502's 64K memory space, we must divide it into banks. If a program in RAM were to replace the entire 64K RAM with another bank, it would cause itself to disappear, and the system would certainly crash. Also, the top 32K of the Atari's address space is cluttered enough with hardware addresses and ROMs that can be switched in and out themselves. The screen RAM is usually in the top 32K and we don't want to switch that out and cause glitches to appear on the screen. Additionally, the operating system keeps important data in the lower part of RAM and it expects the data to be there when it is called. Further, the 6502's stack is in low memory. Worse, interrupts occur frequently



and the routines they invoke also keep data in low RAM. Programs must therefore follow a strict rule: Keep the "normal" bank enabled as much as possible. If you select another bank, you must first disable all interrupts and not call the operating system until the "standard" bank is restored.

### Interfacing the RAM

The interface circuit for the 256K RAM is to be assembled on a small circuit board and installed inside the computer, as the computer's expansion slot doesn't carry the signals we need. The circuit consists of four (or five for older models) chips and replaces one of the chips on the computer motherboard. It also requires jumper wires to various points on the motherboard and connection to 5 pins of the PIA (U23).

The circuit plugs into the socket at position U27 on the motherboard. This gives it access to six important signals, including power and ground. The chip that was at U27 becomes IC1 in the circuit. As U27, this chip was one of the two responsible for selecting which eight of the sixteen address bits are passed to the 64K RAMs at one time.

If your ANTIC (U7) part number is CO21697, use the circuit described by the first connection list at the end of this article. If it is CO12296, include the circuit in the second list. The circuit requires five connections to the PIA (U23). So, pins 12 through 16 must be bent up and connected to the circuit.

The extra circuitry for the older version of the 800XL is an eight-bit binary counter that counts the refresh cycles. It supplies the eighth bit of the refresh address that the 256K chips need. The refresh signal it uses comes to the circuit through a jumper wire from the motherboard.

### Performing the Upgrade

To disassemble the 800XL, remove the six screws on the underside and separate the top and bottom portions of the plastic case. Be careful of the flexible keyboard cable. Pull it straight up out of its socket on the motherboard. To detach the motherboard from the case bottom, remove three screws: one on the right side, one in the right rear corner, and one in the left rear. Gently pull the board free of the case.

Next, remove the small nuts and bolts around the metal shielding that encases the motherboard. On the left side of the exposed motherboard, locate the row of eight 16-pin RAM chips. Just to their right is U27. Behind U27 is a three-inch square area that fits inside the shielding. The circuit goes there, because the shielding is highest toward the rear.

Replace the 64K RAMs with the 256K RAM chips. The new RAMs are very easily destroyed by static discharges, so

extreme care is necessary in their handling. Lay aluminum foil on the work surface and keep the motherboard, RAM chips, tools and hands in contact with the foil at all times. This keeps everything at the same potential, decreasing the possibility of damage.

On the motherboard, locate the video controller, the 40-pin chip at U7. If the part number stamped on it reads "CO21697," you are lucky! You may use the simpler circuit. If the number reads "CO12296," you must use the larger circuit.

Assemble the appropriate circuit on a two by three inch circuit board (Radio Shack's #276-150 is ideal). Use very low profile sockets or no sockets at all, as height is severely limited by the shielding. If you use no sockets, be careful not to apply heat to the IC pins for too long a time. Keep the wiring on the chip side of the board to conserve space. The wiring must be soldered, as there is no room for wire-wrap posts.

The board plugs into the socket at U27 via a 16-pin DIP header and short ribbon cable. Finally, install the jumper wires. Find a resistor marked R32 immediately behind the row of RAM chips and remove it. A trace from one of the holes runs to pin 1 of the RAMs. Solder the first jumper to that hole.

The next jumpers run to a parallel port which the Atari uses to control ROM switching. We need pins 12 through 16, which are normally unused and not connected to any traces. Locate U23 and carefully pry the 40-pin chip from its socket. Bend up pins 12, 13, 14, 15 and 16 so that they point straight out. Reinsert the chip. Cut five adjacent pin positions from an IC socket and solder the jumpers to them. Use this custom socket to connect the jumpers to the three protruding pins. Cover the connector with electrical tape, as the shielding is very low at this point.

If you are using the circuit for the older 800XL, you must install an additional jumper. Locate a trace on the motherboard from pin 8 of the video controller, U7. Along the trace find a hole and solder the jumper there.

Finally, insert a thin piece of stiff cardboard or plastic under the small circuit board to avoid shorting the circuit. Refasten the shielding to the motherboard. If it doesn't fit over the circuit, carefully pound a dent out of the shielding with a hammer. Reassemble the computer.

If all has gone well, the computer should power up and perform normally, although with the 256K in your XL, be sure to wait at least ten seconds after turning the computer off, else it may not coldstart properly when you turn it back on.

The computer is ready to try some software that utilizes the large RAM space.

### The RAM-disk Software

Bank-select RAM is useless without software to control it. The software must obey strict rules as outlined above to work properly. The software must also be tailored to fit the application. Applications vary.

For example, many graphics screens may be stored in the RAM, possibly to be displayed in quick succession for animation. Alternately, the RAM may act as a print spooler. A word processor would print an entire document quickly into the RAM and go on to other jobs while the RAM empties slowly to a printer.

These applications are rather specific and might not appeal to all users. A more universal application is the RAM-disk, a RAM-based disk drive simulator. To DOS and to the user's programs, the RAM-disk appears just as another disk drive, except that it is very fast. The application program may then use standard DOS commands to access the large RAM space. The 192K bytes of available RAM hold more data than two Atari 810 drives or one double-density drive.

The RAMdisk software I have prepared, QMEGXLD.SRC, offers a choice of either two single-density RAMdisks or one double-density. Also available is QMEGXLS.SRC, a RAMdisk program that sets up one single-density RAMdisk and leaves the XE-equivalent banks free for XE software. This is quite useful with BASIC XE, DOS 2.5, or the new Synapse software.

Assemble the source code with any assembler that accepts the syntax of the Atari Assembler/Editor. Assembly produces an object file that performs several tasks as it loads. First, it copies the operating system from ROM into the underlying RAM. Next, the RAM-disk routines load into the RAM-based OS, overwriting the international character set, a little-used feature of the 800XL. Lastly, it patches the OS to install the RAM-disk program and calls DOS's initialization routine to let DOS recognize the new drive.

The source code allows two options: the drive number and the density. The RAM-disk can act as any drive numbered 1 to 8. If you have one real drive, you might want the RAM-disk to be drive number 2. Remember that your DOS must be set up to look for the drive number chosen. See the DOS manual for instructions concerning drive numbers. Typically, you must POKE memory location 1802 with a value of 15 in order to recognize disk drive numbers up to #4. Then you will write new DOS files which will thereafter always include your POKE.

The RAM-disk object file should be made to boot in after DOS so the user needn't worry about it. In Atari DOS, naming the file AUTORUN.SYS accomplishes this. Once the object file has loaded, the RAM-disk MUST BE FORMATTED before use. You may do it manually from DOS, or the application program may do it automatically (use the BASIC XIO command or a call to CIO in machine code).

RESET won't harm the contents of the RAM-disk, nor will rebooting the computer, as long as the computer is not turned off (to reboot without powering down, POKE 580,1 and

press RESET, or jump to \$E477 in machine code). After rebooting, the RAM-disk program must be reloaded to access the data, which should then be found unharmed in the RAM-disk. This is why the RAM-disk program does not automatically format the RAM-disk upon loading.

The major disadvantage to the RAM-disk approach is that all data is lost when the computer is turned off. The application must take care to save important data to a real disk before ending. However, the speed, convenience, and versatility of the RAM-disk overshadow its drawbacks.

#### Uses

An assembly language programmer, after studying the RAM-disk source code and heeding the rules above, can devise many practical uses for a quarter-megabyte of RAM. The large RAM space, joined with the Atari's versatile hardware and low price, gives a performance/price ratio that is unbeatable in today's microcomputer market.

I ask one thing in return for this information: Please pass it around to all your interested friends. Put it in your club's library or on your favorite BBS. Encouraging software support of 256K will result in many interesting uses for it. Thank you and enjoy!

Continued next page

Next month, we will reprint a 256K 800 upgrade.

TAIG can not be responsible for the accuracy, the compatibility, or the possible consequences of performing the hardware modifications printed in this newsletter.

Opening the case on your computer will void the warranty.

Soldering is required to perform these mods, and it is very possible to ruin your computer with a misplaced bead of solder, or touching the soldering iron against the wrong part.

These mods are provided for the more experienced users amongst the group. If you are not comfortable inside the computer with a soldering iron, PLEASE do not attempt these modifications. Some of the vendors or other members may make the mods to your machine at a nominal cost to you.

# DEFINITION OF MEMORY CONTROL REGISTER AT #D301 (54017 DECIMAL)

## XL MOD

bit: 7 6 5 4 3 2 1 0  
D a b E c d B R

D=0 enables diagnostic ROM  
B=0 enables BASIC ROM  
R=1 enables OS ROM  
E=0 enables extended RAM  
abcd is 4-bit extended RAM bank #  
- ranges from 4 to 15  
- banks 12 to 15 are equivalent  
to XE's banks 0 to 3

## 130XE

bit: 7 6 5 4 3 2 1 0  
D V C x y B R

D=0 enables diagnostic ROM  
B=0 enables BASIC ROM  
R=1 enables OS ROM  
V=0 enables extended RAM for video  
C=0 enables extended RAM for CPU  
xy is 2-bit extended RAM bank #  
- ranges from 0 to 3

## PARTS LIST

8 41256 256K-bit dynamic RAM (200ns or less)  
1 74LS153 Dual 4-to-1 multiplexer (IC2)  
1 74LS139 Dual 2-to-4 decoder (IC3)  
1 - 33 ohm, 1/4 watt resistor

## ADDITIONAL PARTS FOR ANTIC #C012296

1 74LS158 Quad inverting 2-to-1 multiplexer (IC4)  
1 74LS393 Dual 4-bit counter (IC5)

## LIST OF CONNECTIONS FOR THE UPGRADE CIRCUIT

Instead of a drawing of the upgrade circuit, below is a list of connections. Each entry in the list begins with the name of the signal followed by all the IC pins that connect together and share the signal. IC3-13 means pin 13 of IC3. The IC numbers appear in the parts list above. IC1 is the 74LS158 chip from socket U27 on the XL motherboard. DIP is the DIP header to be plugged into socket U27. U23-xx refers to the pins you bend up on the PIA chip at U23 on the motherboard.

Vcc : DIP-16, IC1-16, IC2-16, IC3-16, IC3-13  
Vss : DIP-8, IC1-8, IC2-8, IC2-1, IC2-15, IC3-8  
A7 : DIP-11, IC2-10, IC2-11  
A15 : DIP-10, IC2-13, IC3-3  
A6 : DIP-14, IC2-6, IC2-5  
A14 : DIP-13, IC2-3, IC3-2  
MUX : DIP-1, IC1-1, IC2-2  
A4 : DIP-2, IC1-2  
A12 : DIP-3, IC1-3  
RA4 : IC1-4, DIP-4  
A5 : DIP-5, IC1-5

A13 : DIP-6, IC1-6  
 RA5 : IC1-7, DIP-7  
 -E : DIP-15, IC1-15  
 RA7 : IC2-9, DIP-9  
 RA6 : IC2-7, DIP-12  
 PB2 : U23-12, IC2-4  
 PB3 : U23-13, IC2-12  
 PB4 : U23-14, IC3-1  
 PB5 : U23-15, IC1-10  
 PB6 : U23-16, IC1-11  
 -Zd : IC1-9, IC3-14  
 -O1a : IC3-5, IC3-15, IC2-14  
 -O2b : IC3-10, One side of resistor  
 RA8 : Other side of resistor, Pin 1 of all RAMs

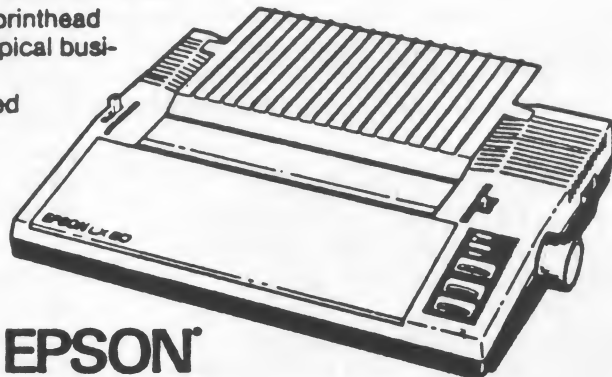
If your U7 part number is C012296, do not connect signal A7 above, and make the following additional connections. The connection to U7 is to a trace on the motherboard that runs from pin 8 of U7.

Vcc : DIP-16, IC4-16, IC5-14, IC4-3  
 Vss : DIP-8, IC4-8, IC4-2, IC4-15, IC5-7, IC5-2, IC5-12  
 A7 : DIP-11, IC4-6  
 -REF : U7-8, IC4-1  
 REF : IC4-4, IC5-1  
 A7' : IC4-7, IC2-10, IC2-11  
 Q7 : IC5-8, IC4-5  
 Q3 : IC5-6, IC5-13

## The facts are in on the Epson LX-80 Printer.

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## THE ATARI 130XE 512K UPGRADE

The Atari 130XE lends itself to memory increases quite easily. For those who may care the Freddie chip (Part # C061991-29) has been around for a while. Remember the 1400 and 1450XL computers? These machines used Freddie strictly for memory management of 64k. The pin on Freddie that we will be concerned with is pin 36. This pin is labeled 16KCAS. Pin 36 is used to enable the extra 64K bank(s) and is active low.

### Technical Overview

Now for the good part. If we redirect the output of pin 36 to another bank of 64K ram chips we can via software select any one of 8 banks of 64K. In this configuration one would have a maximum of 589,815 bytes of memory. The only disadvantage of this is the fact that under these constraints the hardware becomes more complex and the software to drive it does too. I recommend that for general purposes the 130XE be upgraded to a maximum of 320K. It gives the user sufficient "horsepower" and yet at the same time the software does not become too intense.

Now for the bad news. To implement the 320K mod one has to remove the internal basic ROM which really isn't that bad because most users are using Basic XL/XE anyway. The reason for this is quite good. That bit is required for the addressing of the extra bank(s) of memory. Actually one could use the Self-test bit but that requires additional hardware or a reburn of the O.S. ROM. More on that later.

### The Mod

What we will do is to wire up a 74LS138 to the 6520 PIA and to pin 36 of Freddie. This chip can be best described as a routing switch. The data that we want to re-direct is presented at pin 4 of the 138 and the data output is pins 15, 14, 13 and 12. The pins that tell the chip to what bank to direct its output

to are pins 1, 2, and 3. Now for the installation.

1) Take 32 64K x 1 RAM chips and bend out pin 15 on all of them. Pin 15 is the CAS line.

2) Solder these chips onto the existing RAM chips in the 130. Do not solder anything to pin 15 yet! For ease of servicing and soldering I staggered these new RAM chips onto the existing ones. I recommend this highly. When you have completed soldering in each new bank take a piece of insulated wire and solder this wire to pin 15 of each new RAM chip. Wire wrap wire works nicely for this. Continue with this process until all 3 additional banks are wired.

3) Just to the right of Freddie is an area to solder in a 14 pin IC chip. We will use this area to supply +5 and ground to our 74138. Take a 74LS138 and bend out all of the pins except pins 8 and 16. Solder pins 8 and 16 into the holes of the unused chip area next to Freddie.

4) Next to the RAM chips is a chip with the part # of C025953. Behind the chip are two 33 ohm resistors (orange, orange, black, gold). Unsolder the right-most lead of the rear resistor (R111). Solder a wire from the free end of the resistor to PIN 15 of the 74138. Solder another wire from the land where the resistor used to go to pin 4 of the 74138.

5) Solder two wires from pins 11 and 16 of the 6520 PIA chip (Part # C014795-12) to pins 1 and 2 of the 74138. Also ground pins 3 and 5 of the 74138.

6) Solder the CAS line from each new bank of 64K to pins 14, 13, and 12 of the 74138.

7) Unsolder the Basic ROM chip from the board. This is the 24 pin chip that is located closest to the front of the machine just to the left of the 555 timer IC.

Thats it.

DANGERS OF NON-STANDARD  
MEMORY EXPANSIONS  
By: Bill Wilkinson, OSS

Conclusion and Tech notes:

To test each bank boot with DOS 2.5 with your basic cartridge, POKE 5439,49, set the appropriate PIA port bit, go to DOS and reformat D8. Continue through all the banks and check your directory. If you write a file to one bank, switch banks, and write another file, you will not lose what you wrote to the first. The real advantage is that you can have your ramdisk and Basic XE too. Around the bbs's here in Chicago there is a file floating around called RAMDISK2. The source code is available on CompuServe. By re-writing the routine you can have your ramdisk invisible to Basic XE and/or double density.

I mentioned previously about using the Self-test bit in the PIA port. To use this bit you have to disconnect the line on the PIA that runs to the PAL MMU and connect it to a 556 timer that will enable the self-test input to the PAL for about 3-5 seconds. Half of the timer is used for timing and the other half is used as an inverter. The reason for using a timer is that on boot-up the OS uses some of the routines in the self test to check for valid RAM and to determine RAM size. I have done this and then pulled the circuit out. It was just too "messy" to suit me.

One potential problem is the 555 timer used in the 130. This chip is used for system reset timing. If you press your system reset key down and hold it there the system should not reset. If it does you will notice that if you release it the system will reset again. The reason for this is because the 555 timer is putting out a spike that the system sees as a valid reset. To solve the problem replace the chip. It seems about 1 in 10 are bad.

That's it! Hope you enjoy the mod.

Rich Andrews  
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Lockport, IL 60441

This technical note is being written because so many of the memory expansion schemes I see being touted are NOT compatible with a standard 130XE. If you implement the memory expansion per most of these schemes, you will be missing one important feature of the 130XE: the ability to direct ANTIC to do its DMA to either main memory or the requested bank of memory. In a standard 130XE, clearing bit 5 to zero requests ANTIC to follow the bank switching; setting bit 5 to a one tells it to remain in main memory, no matter what memory bank was requested.

This is an important feature! Mark Rose (also of OSS) and I will take credit for being instrumental in the creation of the function of this bit. When Atari asked us to do DOS 2.5 and its RamDisk, their prototype hardware had ANTIC following bit 4 along with the CPU. The most obvious problem with this is that you can't use the extra banks for CPU purposes (e.g., RamDisk) when ANTIC is doing its DMA in the memory between \$4000 and \$7FFF. The problem was especially acute with AtariWriter (the 16K cartridge version), since its display memory is ALWAYS in this range. Actually, Mark and I found that if you are ONLY using the bank select memory for a RamDisk, this is not an onerous restriction. It simply means that you could only do pseudo-sector transfers during vertical blank. And, in fact, DOS 2.5 still has a flag in it which you can POKE which will tell it to only use extended memory during deferred vertical blank.

Now, there was another hardware solution, which we mentioned to Atari: simply never allow ANTIC to use extended memory. We discussed the two options with Atari, and both they and we decided we felt strongly that the capability of bank selecting ANTIC's memory was important. Thus the use of that bit.

So, if your 800XL hardware mod

works with the AtariWriter cartridge, then you obviously adopted that second hardware solution: don't let ANTIC use extended memory. That is not a really terrible decision (especially if it is economically motivated), but it does mean that it is possible that some future 130XE software will not run on your modified machine. (Actually, I already have at least one piece of software, written in ACTION!, which depends on the 130XE's method. But it's only an ultra-fast picture switching demo, so it's no big deal.)

There is a mod to both the 130XE and 800XL which maintains the 130XE/ANTIC bank select capability. It was designed by Charles Andrews of Eugene, Oregon, and he showed a 320XE using this mod at CES in January (in Atari's booth, as a courtesy to him by Atari -- though it does appear to be an implicit endorsement of his scheme). I believe his method uses an entirely separate port for controlling the beyond-130XE extensions (in the \$D6xx range, maybe?). However, I devised a method of doing the same thing using only Port B. The scheme is outlined in the following paragraph.

A "LEGAL" 320XE: This mod depends on the fact that the diagnostic ROM area is only used at power up or by the self-test routines. At these times, both ANTIC and the CPU are using only main memory, so bits 4 and 5 of \$D301 are both set to one. Thus we change the "enable" of the diagnostics from the logic equation  $\text{diag\_enable} = \text{not\_bit7}$  to  $\text{diag\_enable} = \text{not\_bit7 and bit4 and bit5}$ . Then the enable for the extended RAM becomes  $\text{RAM\_enable} = (\text{not\_bit4 or not\_bit5})$  and we can now use bits 6 and 7 for bank selection in the same manner that other schemes use bits 6 and 5. Reason this works: even if Atari ever changes the self-diagnostics so that they check the extended RAM, they can't put that particular code in the ROM which overlays \$5000-\$57FF, because that's right in the middle of the RAM area they need to check!

RAMBO XL  
a hardware review  
by Mark Blumenkamp

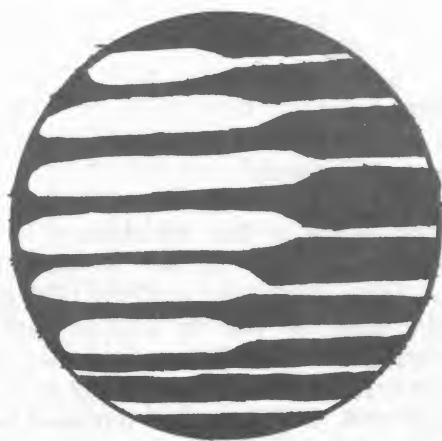
RAMBO XL is a 256K RAM expansion for the ATARI 800XL and 1200XL computers. The RAM is added in such a way as to provide compatibility with the 130XE in the cpu mode. What this means is that to programs such as BASIC XE and ATARIWRITER+ the RAMBO XL add-on makes your 800XL or 1200XL look like an 130XE. However RAMBO XL is NOT compatible with the 130XE ANTIC mode. What this means is if the program you are using has the display memory in the \$4000-\$7FFF range and also switches memory banks the display will flicker as the banks are changed.

RAMBO XL costs \$49.95 and for that you get the RAMBO XL module and the RAMBO XL INSTALL & OPERATIONS MANUAL. You also will need to buy 8 256K DRAM chips as these are not included in the RAMBO XL package. The installation manual is well written with step by step instructions for both the 800XL and the 1200XL. It is necessary to take your computer apart and some skill with a soldering iron is needed. This installation is not for the total novice. First thing you should find out (before you buy the add-on!) is whether the chips in your computer are in sockets or soldered directly to the printed circuit board. If your computer has the chips soldered in it is strongly recommend that you have an expert install the RAMBO XL add-on.

Like the 130XE, RAMBO XL expands the memory of your computer by using a method called bank switching. The 6502 micro-processor used in the ATARI 8 bit computers can only address 64K at one time. To add memory and get around this limitation, the 64K of address space is divided into 4 banks of 16K. One bank (the one from \$4000-\$7FFF) can be switched with one of the 12 extra banks from the 256K RAM. The bank switching method used by the RAMBO XL makes it compatible with the 130XE however where the 130XE switches in four banks (for an added 64K) the RAMBO XL switches in 12 banks (for an added 192K).

RAMBO XL will work with the Atari DOS 2.5 RAMDISK program, for a 64k ramdisk. To make full use of the 256K expansion you will need a RAMDISK handler that can be configured for the size of RAM you have, such as the one for SpartaDOS which will install a 192K RAMDISK. TOP-DOS and MY-DOS also support the RAMBO XL expansion.

If you have a need for extra memory and have some skill with a soldering iron, The RAMBO XL is a nice package and with the 256K DRAMs costs about half as much as a 130XE does.



# TAIG

The  
read/write - verify  
choice.

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